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PTO/SB/05 (4/98)

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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No.	ECB-0010
First Inventor or Application Identifier	RAMESH GUPTA, et.al.
Title	FOULING TOLERANT FIXED BED REACTOR
Express Mail Label No.	EL028161144US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Commissioner for Patents
Box Patent Application
Washington, DC 20231

jc886 U.S. PTO 09/711254 11/14/00

1. [X] * Fee Transmittal Form (e.g., PTO/SB/17) *(Submit an original and a duplicate for fee processing)*
2. [X] Specification *(preferred arrangement set forth below)* Total Pages [14]
   - Descriptive title of the Invention
   - Cross References to Related Applications
   - Statement Regarding Fed sponsored R & D
   - Reference to Microfiche Appendix
   - Background of the Invention
   - Brief Summary of the Invention
   - Brief Description of the Drawings *(if filed)*
   - Detailed Description
   - Claim(s)
   - Abstract of the Disclosure
3. [X] Drawing(s) (35 U.S.C. 113) Total Sheets [1]
4. [X] Oath or Declaration Total Pages [2]
   a. [ ] Newly executed (original or copy)
   b. [X] Copy from a prior application (37 C.F.R. § 1.53(b)) *(for continuation/divisional with Box 16 completed)*
      i. [ ] DELETION OF INVENTOR(S)
      Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).
5. [ ] Microfiche Computer Program *(Appendix)*
6. Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all necessary)*
   a. [ ] Computer Readable Copy
   b. [ ] Paper Copy (identical to computer copy)
   c. [ ] Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. [ ] Assignment Papers *(cover sheet & document(s))*
8. [ ] 37 C.F.R. § 3.73(b) Statement *(when there is an assignee)* [ ] Power of Attorney
9. [ ] English Translation Document *(if applicable)*
10. [ ] Information Disclosure Statement (IDS)/PTO-1449 [ ] Copies of IDS Citations
11. [ ] Preliminary Amendment
12. [X] Return Receipt Postcard (MPEP 503) *(Should be specifically itemized)*
13. [ ] * Small Entity Statement(s) (PTO/SB/09-12) [ ] Statement filed in prior application, Status still proper and desired
14. [ ] Certified Copy of Priority Document(s) *(if foreign priority is claimed)*
15. [ ] Priority of application Serial No. _____ Filed on _____ in _____ (Country) is claimed under 35 U.S.C. 119
16. [X] Other: COPY OF DECLARATION FROM PARENT APPLICATION USSN : 09/351,648

* NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

16. **FEE CALCULATION**

CLAIMS AS FILED				
(1) For	(2) Number Filed	(3) Number Extra	(4) Rate	(5) Basic Fee $710.00
Total Claims	3 - 20	ϕ	x 18.00	ϕ
Independent Claims	1 - 3	ϕ	x 80.00	ϕ
Multiple Dependent Claim Fee			+ 270.00	ϕ
			TOTAL FILING FEE	$ 710.00

[ ] Fee for recording Assignment ($40.00).

[X] Please charge Deposit Account No. 05-1330 in the amount of $ 710.00 .

[X] The Commissioner is hereby authorized to charge any additional fees under 37 CFR 1.16 and 1.17 which may be required during the entire pendency of the application, or credit any overpayment, to Deposit Account No. 05-1330. A duplicate copy of this Form is enclosed.

17. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:

[ ] Continuation [X] Divisional [ ] Continuation-in-part (CIP) of prior application No.: 09 / 351,648

Prior application information: Examiner: B. RIDLEY Group / Art Unit: 1764

[X] Cancel in this application original claims 1-8 of the prior application before calculating the filing fee.

[X] Amend the specification by inserting before the first line the sentence:
This is a [ ] Continuation, [X] Divisional, of the application Serial No. 09/351,648, filed July 13, 1999.
For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

18. CORRESPONDENCE ADDRESS

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[ ] Pursuant to 37 CFR 1.34(a)

[X] "Express Mail" mailing label number EL028161144US . Date of Deposit NOVEMBER 14, 2000 .
I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

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(Signature of person mailing paper or fee)

APPLICATION FOR UNITED STATES PATENT

FOULING TOLERANT FIXED BED REACTOR (ECB-0010)

Applicants: Ramesh Gupta
Salvatore J. Rossetti
David C. Dankworth
Jeffrey L. Kaufman
David L. Vannauker
James P. Bailor

CROSS REFERENCE TO RELATED APPLICATION:

This application is a Divisional of U.S. Serial No. 09/351,648 filed July 13, 1999.

EXXON PROPRIETARY INFORMATION
For Authorized Company Use Only

U. S. SERIAL NO. 351648

FILED JUL 13 1999

BASED ON: Patent Memorandum 99EE018

APPLICANTS: Ramesh Gupta
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TITLE: FOULING TOLERANT FIXED BED REACTOR

CASE NO. LAW858

ECB:iem
June 23, 1999

APPLICATION FOR UNITED STATES PATENT

FOULING TOLERANT FIXED BED REACTOR (LAW858)

Applicants: Ramesh Gupta
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"EXPRESS MAIL" mailing label
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Date of Deposit July 13, 1999

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(Signature of person mailing paper or fee)

FOULING TOLERANT FIXED BED REACTOR (LAW858)

FIELD OF THE INVENTION

An embodiment of the instant invention is directed to a reactor having bypass apparatus for extending the operating life of the reactor.

BACKGROUND OF THE INVENTION

In the normal operation of fixed bed chemical and oil refining reactors, the top of the catalyst bed often becomes fouled or plugged by the deposition of organometallic compounds, polymeric and carbonaceous materials and organic and inorganic particulates. The plugging of the catalyst bed is undesirable since the resultant increase in pressure drop necessitates costly shut-downs or throughput reduction and requires time consuming repairs and maintenance.

In an effort to overcome this problem, many schemes have been devised, where each reactor is equipped with more than one catalyst bed and a plugged bed is bypassed to extend the operating life of the reactor (see for example, U. S. Patents 3,509,043; 4,313,908; and 5,670,116). The shortcoming of such teachings is that they require an auxiliary bypassable bed. For example, the above teachings are not applicable to reactors having only a single fixed bed of catalyst particles.

Additionally, schemes involving the use of what is commonly referred to in the art as trash baskets have been developed. In such schemes, as taught by U. S. Patents 3,992,282 and 3,888,633, particulate impurities are

removed from a fluid stream flowing into a fixed bed of catalyst by a hollow basket or scale traps that extends into the catalyst bed.

While the trash baskets described by the prior art tend to remove particulates contained in the fluid streams being passed through the reactor, they have only a small effect in minimizing pressure drop buildup due to fouling. The trash basket walls, usually made from screen mesh material, get fouled and plugged with particulates within a short period of time. Thus, the flow passage of the fluid streams is occluded and the pressure drop begins to rise, though at a somewhat slower rate than if the baskets were not used. Very often, it is desirable to keep these reactors on stream without significant pressure drop buildup for a long period of time lasting several years. Thus, the trash baskets do not provide adequate protection against pressure drop buildup, and an alternate method is needed to extend the run length of these reactors. What is needed in the art is a method which allows accumulation of the foulant particulates at the bed top while at the same time bypasses the reactants across this foulant particulate layer and distributes them to the catalyst bed underneath without significant pressure drop.

SUMMARY OF THE INVENTION

An embodiment of the invention is directed to a reactor for reacting a feedstock, said reactor comprising,

a fixed catalyst bed for reaction of said feedstock, said reactor containing a bypass apparatus disposed within said fixed catalyst bed,

said bypass apparatus being aligned with the direction of flow of said feedstock, and wherein said bypass apparatus comprise

a cage member comprising a first elongated hollow member having a top wall, side walls and a bottom wall said cage member having openings therein, and

a second hollow elongated member for passing said feedstock therethrough, said second hollow elongated member being disposed within and protruding through said top wall of said cage member and wherein said second elongated member extends above said catalyst bed through said cage member.

A further embodiment of the invention is directed to a method for extending the operating life of a fixed bed reactor for reacting a feedstock in which a feedstock is contacted with a fixed bed of catalytic material contained in said reactor said fixed bed of catalytic material having a top and bottom layer and wherein the pressure drop across said top layer of said fixed bed of catalyst material increases during reaction of said feedstock due to fouling of said top layer of said fixed bed of catalytic material, comprising the sequential steps of (a) introducing said hydrocarbon feedstock into said fixed bed of catalytic material, (b) as said top layer of said fixed bed of catalytic material fouls, bypassing an increasing amount of said feedstock to said bottom layer of said fixed bed of catalytic material.

BRIEF DESCRIPTION OF THE FIGURES

The figure depicts one possible embodiment of the invention. The second elongated member (1) is disposed within a cage member (2). The cage member (2) has an upper enclosed portion (top wall and upper portion of the side walls) (3) and a lower perforated portion (bottom wall and lower portion of sidewalls) (4). The bypass apparatus are located within the fixed bed (5) of a

reactor (6). Optionally, the second hollow elongated member may have a cap (7) over the portion of the member extending above the catalyst bed. The figure likewise shows an optional layer of inert material (8) disposed within the catalyst bed in which the bypassed material is distributed.

DETAILED DESCRIPTION OF THE INVENTION

An embodiment of the present invention finds particular applicability in connection with increasing the cycle life of a fixed bed of catalyst particles contained within a hydroprocessing reactor in which a hydrocarbon feedstock is processed during the carrying out of any one of a multitude of chemical reactions.

Such reactors are typically used for the conversion or treatment of hydrocarbon or chemical feedstocks in the presence of a vapor phase, such as hydrogen containing treat gas. Nonlimiting reactors for which the present invention can be utilized include those used for hydroconversion of heavy petroleum feedstocks to lower boiling products; the hydrocracking of distillate boiling range feedstocks; and hydrotreating of various petroleum feedstocks, such as light hydrocarbons, naphtha and distillate boiling range streams. More particularly, the reactors on which the present invention are practiced are those having one fixed bed reaction or catalyst bed. This invention is also applicable to reactors having more than one catalyst bed but in which only the top portion of any of the fouling prone beds is bypassed.

For example, the bypass apparatus utilized herein can be particularly beneficial in preventing the fouling of a fixed catalyst bed utilized for contacting, a stream of hydrocarbon feedstock with a conventional reforming or hydroprocessing catalyst. The bypass apparatus allows the feedstock to

bypass the upper portion or layer of the catalyst bed once fouling occurs, enabling the bed to be run for substantially longer periods of time as compared to running without the bypass apparatus.

Existing units can easily be equipped with the bypass apparatus to enable them to run for longer periods of time.

In an embodiment of the present invention, the second hollow elongated member extends both above the catalyst bed and into the catalyst bed. The cage member can be either partially or fully embedded or buried in the bed such that the section having openings therein discharges and distributes the bypassed hydrocarbon feed to an elevation within the bed below the top fouling layer of the bed. Preferably, the cage is closed at the top except for where the first hollow elongated member extends therethrough. However, depending upon the application, the entire cage member may have openings therein, including in the top, sides, and bottom. A cage member having an enclosed top is depicted in the Figure with openings in the bottom and sidewalls of the lower portion of the cage member.

The second elongated member extends through the first hollow elongated cage member preferably terminating substantially at the portion having openings therein. This allows for distribution of the bypassed hydrocarbon feedstock through the openings in the cage member. However, the second elongated member may stop short of the openings, or extend to an area within the portion of the cage member having openings. Preferably, the bottom of the cage member will likewise be enclosed and only the sidewalls will have the openings in the lower portion of the cage member. Preferably, the openings in the cage member will begin at a depth in the bed below the top layer of the catalyst bed. If desired, for example, in a cage buried in a catalytic bed below

the surface of the bed, the entire cage length can have openings therein . For example, in a catalyst bed where only the top surface of the bed becomes fouled, it would be desirable to bypass feedstock, just below the fouled surface.

Referring now to the Figure, there is illustrated a conventional catalytic reactor vessel (6) containing a fixed bed of catalyst particles (5). Shown is one bypass apparatus. However, the invention may comprise a plurality of bypass apparatus spaced over the catalyst bed. Furthermore, each individual bypass apparatus may extend into the catalyst bed to different depths.

The bypass apparatus are inserted into the catalyst bed such that the cage is buried into the bed and the second hollow elongated member extends above the top surface of the bed. The cage member is perforated or is made from a material having openings and acts as a distributor for the hydrocarbon feed passing through the first hollow elongated member. The perforations may simply be made in the material of which the cage member is constructed, or a portion of the cage member can be constructed of a mesh type material. The area of the cage having openings therein is easily determinable by the skilled artisan. Only the sidewalls may have openings, or other areas of the cage member such as the top and bottom walls may likewise have openings therein. It is preferred that the size of the openings be large enough so that any small quantity of the particulates that are entrained in the bypassed flow are able to leave the cage and get distributed into the bed. Typically, the openings will range in size from about 1/8 inch (0.31 cm) to about 1/2 inch (1.25 cm) wide holes or slits. Alternatively, the openings can be sized small enough so that any bypassed foulant particulates will be retained within the cage. Bypass foulant particles are small particles contained in the hydrocarbon feed that are bypassed through the second hollow elongated member and which contribute to fouling of the catalyst bed. The bypass apparatus is embedded within the fixed catalyst bed

such that the bottom of the cage is contained within the catalyst bed and the bypassed feed is distributed to the bottom layer of the catalyst bed. As used herein, the bottom layer of the catalyst bed is the area located beneath the area of the bed where substantial fouling during reactor operation occurs. This area is readily recognized by the skilled artisan. The top layer is the area above the bottom layer from the surface of the bed to a depth within the bed where substantial fouling occurs during reactor operations. Typically, the bottom of the catalyst bed is the portion of the bed located at least about 2.5 feet (75 cm) from the bed surface. However, depending upon the given operation, it is possible for the bottom layer of the bed to be located as little as about 6 inches (15 cm) from the catalyst bed surface. In such a case, only the top surface of the bed becomes fouled and will be bypassed. Again, the skilled artisan, taking into consideration the reactor and operation being performed, can determine the area of the catalyst bed to be bypassed.

One or more bypass apparatus may be utilized in any given bed. The cage member may extend through the catalyst bed to the same or different depths within the beds bottom layer. The bypass apparatus utilized herein maintain the catalytic bed integrity and prevent the high exit velocities of the second elongated member from eroding the bed or causing the bed to slump, increase pressure drop, and deteriorate unit performance.

The reactor is operated by introducing the hydrocarbon feedstock to be reacted in the catalyst bed along with a suitable treat gas, if necessary, such as hydrogen. The feedstock can be a liquid, vapor, or mixture thereof. The reactor is operated at suitable conditions for the process being run. Such conditions are known in the art and are not modified by use of the bypass apparatus being utilized herein. The feedstream undergoes the desired chemical reaction as it moves through the catalyst bed. At the beginning, when the

catalyst bed is clean and no foulants have deposited at the bed top, a majority of the flow will go through the catalyst bed instead of the bypass apparatus. This is because the bypass apparatus, particularly the second hollow elongated member, typically tubes, are sized to have a significantly high pressure drop relative to the clean bed, and the flow takes the path of least resistance. The second hollow elongated members are typically sized to provide a pressure drop of a factor of about 5 to about 25 higher relative to the clean bed. As the bed top fouls during operation, the resistance to flow through the bed increases, and an increasing fraction of the flow is bypassed through the bypass apparatus. Thus, the second hollow elongated members, typically tubes, are sized to have a flow resistance which is significantly higher than the flow resistance of the clean bed. As an example, the pressure drop through a clean (unfouled) top four feet layer of the catalyst bed would be typically 0.5 to 2 psi in a typical hydroprocessing reactor. Depending upon the operation, the bypass tubes will be sized to have a flow resistance of about 10 to 50 psi with total flow in the tubes. With this bypass arrangement, the pressure drop through the top four feet section of the bed will never exceed 50 psi. If the bypass tubes were not used, the pressure drop could be significantly higher than 50 psi upon fouling which would necessitate a reactor shutdown or throughput reduction.

The bypass apparatus can be any suitable structure that meets the criteria set forth herein. Preferably, both the second hollow elongated member and the cage member will be tubular in structure. The bypass apparatus will be constructed from material compatible with the operating conditions of the reactor. For example, suitable materials may include metals such as carbon steel and stainless steel, ceramic materials, and other composite materials such as carbon fiber reinforced materials.

The second hollow elongated member, through which the feedstock is bypassed, may be of any diameter or width depending upon the amount and rate of material one wishes to bypass to the bottom, unfouled layer of the catalyst bed. Such diameters are easily determined by the skilled artisan. For example, the diameter of the second hollow elongated member can range from about 0.25 inch (0.625 cm) to about 12 inch (30 cm), more preferably from about 0.5 inch (1.25 cm) to about 6 inch (15 cm), and most preferably from about 0.5 inch (1.25 cm) to about 3 inch (7.5). The cage member, likewise, may be of any diameter. For example, from about 3 inch (7.5 cm) to about 20 inch (50 cm), more preferably from about 4 inch (10 cm) to about 12 inch (30 cm), and most preferably from about 4 inch to about 10 inch. The number of bypass apparatus utilized is dependent upon the size of the reactor and the flow rates in the reactor. As indicated earlier, the number of bypass apparatus is chosen such that the bypass apparatus offer higher resistance to flow than the clean beds, less resistance than a fouled bed. One or more bypass apparatus may be utilized. When determining the number and location of the bypass apparatus, the skilled artisan will take into consideration localized velocities, residence times, temperature distribution, etc. The number and location of the apparatus will be chosen such that the units performance is maintained.

The section of the cage member having perforations functions as a distributor for the bypassed feedstock into the catalyst bed through the second hollow elongated member. It is preferred that the area surrounding the cage perforations be packed with a layer of packing material of a size that will assist in the distribution of the bypassed feedstock through the catalyst bed. The packing material allows any particulates flowing into the bypass apparatus to be dispersed upon exiting the cage openings. The packing material could be any inert material such as alumina balls typically used to support catalyst in a fixed bed. The packing material could also be any other material or even catalyst

particles. Catalyst particles, if chosen, will be of an appropriate size to distribute the feedstock being bypassed. Use of particles for distribution is merely optional and is not required. Typically, the particles will range in size from about 1/4 inch (0.625 cm), up to about 3 (7.5 cm) to about 4 (10 cm) inches. In addition to alumina balls, several other packing materials that are typically used in packed towers could also be used.

In a preferred embodiment of the invention, the second hollow elongated member may have a device at the top to facilitate separation of particulates from the bypassed hydrocarbon feed. For example, a cap as is shown in the Figure could be used. The downward moving hydrocarbon feed from the reactor inlet is forced to change its direction by the cap so that the feed can move upward and then enter the bypass apparatus. While the flow direction of the feed is changed by the cap, the inertia of the particulates prevent these particulates from changing their flow direction These particulates separate out and accumulate at the bed top. Thus, a separation device allows the bypassing of a relatively particulate free feed to bypass the fouled top section of the bed, and fouling in the interior sections of the bed is minimized. While the separation cap would remove the large particulates, depending upon the sizes of the incoming particulates, some of the very small particulates may not get separated by the inertial separation. Very often, these very small particulates that have failed to separate are so small in size that they will pass through the catalyst bed without plugging it. If some of these very small particulates are unable to go through the catalyst bed, they will disperse in the layer of the inert packing that surrounds the cage perforations or openings. Thus, pressure drop buildup is minimized. In addition to a simple cap, other separation devices could also be used. Examples of these separation devices include small centrifugal separators or cyclones mounted on the top of each bypass tube.

WHAT IS CLAIMED IS:

1. A reactor for reacting a feedstock, said reactor comprising,

a fixed catalyst bed for reaction of said feedstock, said reactor containing a bypass apparatus disposed within said fixed catalyst bed,

said bypass apparatus being aligned with the direction of flow of said feedstock, and wherein said bypass apparatus comprise

a cage member comprising a first elongated hollow member having a top wall, sidewalls and a bottom wall, said cage member having openings therein, and

a second hollow elongated member for passing said feedstock therethrough, said second hollow elongated member being disposed within and protruding through said top wall of said cage member and wherein said second elongated member extends above said catalyst bed through said cage member.

2. The reactor of claim 1 wherein the said second hollow elongated member is a tubular member having a diameter from about 0.25 to about 12 inches.

3. The reactor of claim 1 wherein said cage member is a tubular member having a diameter of about 3 to about 20 inches.

4. The reactor of claim 1 wherein said second hollow elongated member has a pressure drop of about 5 to about 50 times greater than that of said top layer of said catalyst bed when said catalyst bed is a fresh catalyst bed.

5. The reactor of claim 1 further comprising a separation device disposed above said second hollow elongated member.

6. The reactor of claim 5 wherein said separation device is selected from the group consisting of caps, centrifugal separators and cyclones.

7. The reactor of claim 1 wherein said fixed catalyst bed contains packing material for distributing particulates passing through said bypass apparatus.

8. The reactor of claim 7 wherein said packing material is selected from the group consisting of catalyst particles, alumina balls, inert particles, inert packing and mixtures thereof.

9. A method for extending the operating life of a fixed bed reactor for reacting a feedstock in which a feedstock is contacted with a fixed bed of catalytic material contained in said reactor said fixed bed of catalytic material having a top and bottom layer and wherein the pressure drop across said top layer of said fixed bed of catalyst material increases during reaction of said feedstock due to fouling of said top layer of said fixed bed of catalytic material, comprising the sequential steps of (a) introducing said hydrocarbon feedstock into said fixed bed of catalytic material, (b) as said top layer of said fixed bed of catalytic material fouls, bypassing an increasing amount of said feedstock to said bottom layer of said fixed bed of catalytic material.

10. The method of claim 9 wherein said hydrocarbon feed is selected from the group consisting of liquid feed, vapor feed, and mixtures thereof.

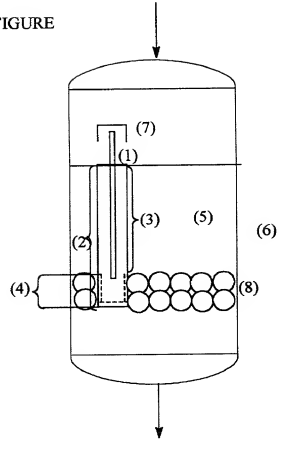
11. The method of claim 9 wherein said feedstock is selected from the group consisting of hydrocarbon feedstocks, chemical feedstocks, and mixtures thereof.

FOULING TOLERANT FIXED BED REACTOR (LAW858)

ABSTRACT OF THE DISCLOSURE

The invention is directed to a reactor for reacting a feedstock, said reactor comprising, a fixed catalyst bed for reaction of said feedstock, said reactor containing a bypass apparatus disposed within said fixed catalyst bed, said bypass apparatus being aligned with the direction of flow of said feedstock, and wherein said bypass apparatus comprise a cage member comprising a first elongated hollow member having a top wall, sidewalls and a bottom wall, said cage member having openings therein, and a second hollow elongated member for passing said feedstock therethrough, said second hollow elongated member being disposed within and protruding through said top wall of said cage member and wherein said second elongated member extends above said catalyst bed through said cage member.

FIGURE



"PATENT"

DECLARATION FOR PATENT APPLICATION

Case Docket No. LAW858

As below named inventors

RAMESH GUPTA
JEFFREY L. KAUFMAN
SALVATORE J. ROSSETTI
DAVID L. VANNAUKER
DAVID C. DANKWORTH
JAMES P. BAILOR

We hereby declare that residence, post office address and citizenship are as stated on page 2.

We believe we are the original, first and joint inventors of the subject matter which is claimed and for which a patent is sought on the invention entitled FOULING TOLERANT FIXED BED REACTOR, the specification of which

(check one) [X] is attached hereto.

[ ] was filed on _____ as Application Serial No. _____

and was amended on _____ (if applicable).

We hereby state that we have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

We acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

We hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate(s) listed below and have also identified below any foreign application(s) for patent or inventor's certificate(s) having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
(Number)	(Country)	(Day/Month/Year Filed)	[ ] Yes	[ ] No
(Number)	(Country)	(Day/Month/Year Filed)	[ ] Yes	[ ] No

We hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, we acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)

POWER OF ATTORNEY: As named inventors, we hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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Case Docket No. LAW858

We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Inventor's Signature Ramesh Gupta Date 6-29-99

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Inventor's Signature Salvatore Rossetti Date 6/29/99

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POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE OR COUNTRY	ZIP CODE
	3 Springtown Road	Whitehouse Station	New Jersey	08889

Inventor's Signature Date 6/29/99

FULL NAME OF INVENTOR	LAST NAME	FIRST NAME	MIDDLE NAME	
	KAUFMAN	JEFFREY	L.	
RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP	
	Kingwood	Texas	U.S.A.	
POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE OR COUNTRY	ZIP CODE
	2807 Cedarville Drive	Kingwood	Texas	77345

Inventor's Signature Jeffrey L. Kaufman Date 6/30/99

FULL NAME OF INVENTOR	LAST NAME	FIRST NAME	MIDDLE NAME	
	VANNAUKER	DAVID	LEE	
RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP	
	Kingwood	Texas	U.S.A.	
POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE OR COUNTRY	ZIP CODE
	1811 Teal Arbor Lane	Kingwood	Texas	77345

Inventor's Signature David L Vannauker Date 7/7/99

FULL NAME OF INVENTOR	LAST NAME	FIRST NAME	MIDDLE NAME	
	BAILOR	JAMES	PHILIP	
RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP	
	~~Danville~~ Seabrook	~~New Jersey~~ Texas	U.S.A.	
POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE OR COUNTRY	ZIP CODE
	~~4 Riverdale Crescent~~ 2214 Acadian St	~~Danville~~ Seabrook	~~New Jersey~~ Texas	~~07926~~ 77586

JJB JJB

Inventor's Signature James L. Bailor Date 7/7/99